Advanced Passive 1000 (AP1000)
Generic Technical Specification Traveler (GTST)

Title: Changes Related to LCO 3.7.3, Main Feedwater Isolation and Control Valves (MFIVs and MFCVs)

I. Technical Specifications Task Force (TSTF) Travelers, Approved Since Revision 2 of STS NUREG-1431, and Used to Develop this GTST

TSTF Number and Title:

TSTF-425-A, Rev 3,	Relocate Surveillance Frequencies to Licensee Control – RITSTF Initiative 5b
TSTF-479-A, Rev 0,	Changes to Reflect Revision of 10 CFR 50.55a
TSTF-491-A, Rev 2,	Removal of Main Steam and Main Feedwater Valve Isolation Times From Technical Specifications
TSTF-504-T, Rev 0,	Revised the MSIV and MFIV Specifications to Provide Actions for Actuator Trains

STS NUREGs Affected:

TSTF-425-A, Rev 3:	NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-479-A, Rev 0:	NUREGs 1430, 1431, 1432, 1433, and 1434
TSTF-491-A, Rev 2:	NUREGs 1430, 1431, and 1432
TSTF-504-T, Rev 0:	NUREGs 1431 and 1432

NRC Approval Date:

TSTF-425-A, Rev. 3:	06-Jul-09
TSTF-479-A, Rev 0:	06-Dec-05
TSTF-491-A, Rev 2:	29-Dec-06
TSTF-504-T, Rev 0:	Approved for Use by TSTF 14-Sep-07

TSTF Classification:

TSTF-425-A, Rev 3:	Technical Change
TSTF-479-A, Rev 0:	Technical Change
TSTF-491-A, Rev 2:	Technical Change
TSTF-504-T, Rev 0:	Technical Change

II. Reference Combined License (RCOL) Standard Departures (Std. Dep.), RCOL COL Items, and RCOL Plant-Specific Technical Specifications (PTS) Changes Used to Develop this GTST

RCOL Std. Dep. Number and Title:

There are no Vogtle departures applicable to Specification 3.7.3.

RCOL COL Item Number and Title:

There are no Vogtle COL items applicable to Specification 3.7.3.

RCOL PTS Change Number and Title:

VEGP LAR DOC A003:	References to various Chapters and Sections of the Final Safety Analysis Report (FSAR) are revised to include FSAR.
VEGP LAR DOC A096:	TS 3.7.3 title revision
VEGP LAR DOC A097:	Change individual valves to flow path
VEGP LAR DOC M11:	Containment valve isolation revisions to TS 3.7.3
VEGP LAR DOC M15:	Applicability revision to TS 3.7.3
VEGP LAR DOC D09:	Closure time removal

III. Comments on Relations Among TSTFs, RCOL Std. Dep., RCOL COL Items, and RCOL PTS Changes

This section discusses the considered changes that are: (1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

TSTF-425-A deferred for future consideration.

TSTF-479-A has been applied to AP1000 GTS 3.7.3, Rev 19 by Westinghouse. TSTF-479-A will not be discussed further as a part of this GTST.

TSTF-491-A, Rev. 2 changes to the SR Bases (to only reference document containing the MSIV and alternate downstream valve closure times) are not adopted, based on APOG presentation preference expressed in DOC D09. DOC D09 is consistent with TSTF-491, which allowed the closure times to be moved to a plant-controlled document (SR 3.7.3.1 Bases discussion).

TSTF-504-T, Rev. 0 revises WOG Specification 3.7.3 based on license amendments granted for Wolf Creek, Callaway, and Palo Verde regarding dual actuator trains for isolation valves. A specific need should be identified for the AP1000 design and a separate AP1000-specific TSTF issued to implement a similar change. Therefore, the TSTF-504-T changes are not applicable and are not incorporated in the AP1000 Technical Specifications. TSTF-504-T will not be discussed further as a part of this GTST.

IV. Additional Changes Proposed as Part of this GTST (modifications proposed by NRC staff and/or clear editorial changes or deviations identified by preparer of GTST)

Minor corrections were made to correct grammatical errors in the Bases.

Revise the fourth paragraph with the bulleted list in the "Background" section of the Bases to state (NRC Staff Comment):

> The MFIVs and MFCVs close on receipt of engineered safeguards feedwater isolation signal generated from any of the following conditions:
>
> - Automatic or manual safeguards actuation "S" signal
>
> – **Safeguards Actuation - Manual Initiation (Table 3.3.9-1 Function 1)**
> – **Containment Pressure - High 2 (Table 3.3.8-1 Function 2)**
> – **Pressurizer Pressure - Low (Table 3.3.8-1 Function 5)**
> – **RCS Cold Leg Temperature (T_{cold}) - Low (Table 3.3.8-1 Function 11)**
> – **Steam Line Pressure - Low (Table 3.3.8-1 Function 24)**
>
> - **Steam Generator Narrow Range Water Level - High 2 (Table 3.3.8-1 Function 23)** ~~High steam generator level~~
>
> - **Reactor Coolant Average Temperature (T_{avg}) - Low 2 (Table 3.3.8-1 Function 13)** ~~Low-2 T_{avg} signal~~ coincident with reactor trip (P-4) **(LCO 3.3.12) (MFIVs only)**
>
> - **Reactor Coolant Average Temperature (T_{avg}) - Low 1 (Table 3.3.8-1 Function 12) coincident with reactor trip (P-4) (LCO 3.3.12) (MFCVs only)**
>
> - **Feedwater Isolation - Manual Initiation** ~~Manual actuation~~ **(Table 3.3.9-1 Function 5)**
>
> ~~Additionally, the MFIVs close automatically on a Low-1 Tavg coincident with reactor trip (P-4).~~ Each valve may be actuated manually. In addition to the MFIVs and the MFCVs, a check valve is available outside containment to isolate the feedwater line penetrating containment. In the event of feedwater line depressurization due to pump trip on **a feedwater** line break, the check valve provides rapid backup isolation of the steam generators limiting the inventory loss. A description of the MFIVs and MFCVs is found in Reference 1.

Revise the third sentence of the first paragraph in the "ASA" section of the Bases to state (NRC Staff Comment):

> . . . Closure of the MFIVs ~~(or~~**and** MFCVs~~)~~ may also be relied on to mitigate an SLB for core response analysis and excess feedwater event upon the receipt of a ~~steam generator water level - High 2~~ **Steam Generator Narrow Range Water Level - High 2 (Table 3.3.8-1 Function 23)** signal.

Revise the first and third paragraphs of the "Actions" section of the Bases under the heading "A.1 and A.2" to state (NRC Staff Comment):

~~With~~**The condition of** one or **both feedwater flow paths with an MFIV or MFCV inoperable corresponds to one of the following possible situations: (one or** two MFIVs **inoperable**, ~~or~~ one or two MFCVs **inoperable, or the MFIV inoperable in one flow path and the MFCV inoperable in the other flow path.** ~~inoperable),~~ **In this condition, each** ~~the close or isolate inoperable~~ affected flow path **must be isolated** in 72 hours. When ~~these~~**a feedwater** flow path~~s are~~ **is** isolated, ~~they are~~ **it is** performing the~~ir~~ required safety function.

. . .

For inoperable MFIVs and MFCVs ~~valves~~ that cannot be restored to OPERABLE status within the specified Completion Time ~~but whose affected~~**for which each associated flow path is** ~~are closed or~~ isolated, the **affected** flow paths must be **periodically** verified ~~on a periodic basis~~ to be ~~closed or~~ isolated. This is necessary to ensure that the assumptions in the safety analyses remain valid. The ~~7 day~~**periodic** Completion Time **of once per 7 days** is reasonable based on engineering judgment, in view of valve status indications available in the control room~~,~~ and other administrative controls~~, to~~**that** ensure ~~that these valves are closed or~~**each affected feedwater flow path remains** isolated.

Revise the first paragraph of the “Actions” section of the Bases under the heading “B.1” to state (NRC Staff Comment):

With ~~both feedwater flow paths with~~**the** ~~associated~~ **MFIV and MFCV both inoperable** ~~(two inoperable valves in the same flow path)~~ **in one or both feedwater flow paths**, there may be no redundant system to ~~operate~~ automatically ~~to and~~ perform the required **isolation** safety function **in each affected feedwater flow path**. ~~Under these conditions,~~ **In this condition, within 8-hours, either** one valve in ~~the~~**each** affected flow path must be restored to OPERABLE status, or ~~the~~**each** affected flow path **must be** isolated ~~within 8-hours~~. This action returns the system to the situation in which at least one valve in ~~the~~**each** affected flow path is performing the required safety function. The 8 hour Completion Time is a reasonable amount of time to complete the actions required to **isolate the affected flow paths, which may include closing** ~~close~~ the MFIV~~,~~ or MFCV, ~~which includes~~ **and** performing a controlled plant shutdown. The Completion Time is reasonable based on operating experience to reach MODE 2 with the **feedwater flow paths isolated** ~~MFIV or MFCV closed~~, from full-power conditions in an orderly manner and without challenging plant systems.

APOG Recommended Changes to Improve the Bases

Revise the first sentence of the “LCO” section of the Bases to state:

This LCO ensures that the MFIVs and the MFCVs will isolate the main feedwater system **to the secondary side of the steam generators**.

Revise the third sentence of the first paragraph in the “Applicability” section of the Bases to state:

In MODE**S** 1, 2, 3, ~~or~~**and** 4, these valves are required to be OPERABLE to limit...

In the “Actions” section of the Bases under the heading “B.1” revise the first paragraph as follows:

With **one or** both feedwater flow paths with associated MFIV and MFCV inoperable . . .

These non-technical changes provide improved clarity, consistency, and operator usability.

Revise the first paragraph of the “SRs” section of the Bases, under the heading “SR 3.7.3.1” to state:

> This SR verifies that the closure time of each MFIV and MFCV is **≤ 5.0 seconds,** ~~within the limit given in Reference 2~~ on an actual or simulated actuation signal**.** **The MFIV and MFCV isolation times are** ~~and is within that~~ assumed in the accident and containment analyses. . . . ~~This SR also verifies the valve closure time is in accordance with the Inservice Testing Program.~~ This **Surveillance** ~~SR~~ is normally performed upon returning the unit to operation following a refueling outage. . . . This is consistent with the ASME OM Code (Ref. **2**~~3~~) quarterly stroke requirements during operation in MODE 1 or 2.

DOC D09 made the Regulatory commitment to relocate the closure time to the Bases. Similarly, V.C. Summer TSU LAR proposes the same commitment to the Bases. Since each represented AP1000 Utility is committed to maintaining standardization, there currently is no rationale for an AP1000 STS that differs from the TSU LAR commitments and plant- specific Bases for VEGP. The TSTF-491-A changes should be removed. The remainder of the change is non-technical and provides improved clarity, consistency, and operator usability. Reference 2 inserted by TSTF-491 should be removed.

> . . . This is consistent with the ASME OM Code (Ref. **2**~~3~~) quarterly stroke requirements during operation in MODE**S** 1 **and**~~or~~ 2.

Throughout the Bases, references to Sections and Chapters of the FSAR do not include the “FSAR” clarifier. Since these Section and Chapter references are to an external document, it is appropriate to include the “FSAR” modifier. (DOC A003)

V. Applicability

Affected Generic Technical Specifications and Bases:

Section 3.7.3, Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Control Valves (MFIVs and MFCVs)

Changes to the Generic Technical Specifications and Bases:

The LCO title is revised to include all flow path isolation valves. This provides clarification of the LCO coverage. (DOC A096)

The Applicability statement is revised to remove the exception statement. (DOC M11 and DOC M15)

The GTS 3.7.3 Action Note is revised to indicate feedwater flowpath instead of valve. This is consistent with the LCO statement for flow path isolation. (DOC A097)

GTS 3.7.3 Conditions A, B, C and D and the associated Required Actions are revised to reflect the feedwater flow path (Condition B is eliminated). This is consistent with the LCO statement for flow path isolation. (DOC A097)

The specific closure times associated with SR 3.7.3.1 is replaced with the phrase “within limits.” The affected valve isolation times are important to the safety analyses because they are part of the associated overall ESF Response Time assumed in the safety analyses. However, the individual component actuation times that make up the total ESF Response Time are not modeled in the associated safety analysis. Only the overall or total Response Time is considered in the safety analysis. The NRC has already determined (per Generic Letter 93-08) that the ESF Response Times (which include, by technical specification definition, the associated equipment actuation times) do not need to be in the technical specifications. (TSTF-491-A and DOC D09)

The fourth paragraph in the “Background” section of the Bases is revised to provide improved clarity. (NRC Staff Comment)

The third sentence of the first paragraph in the “Background” section of the Bases is revised to provide improved clarity. (NRC Staff Comment)

The first sentence of the first paragraph in the “LCO” section of the Bases is revised to provide improved clarity, consistency, and operator usability. (APOG Comment and NRC Staff Edit)

The third sentence of the first paragraph in the “Applicability” section of the Bases is revised to provide improved clarity, consistency, and operator usability. (APOG Comment)

The first and third paragraphs of the “Actions” section of the Bases under the heading “A.1 and A.2” are revised to provide improved clarity, consistency, and operator usability. (NRC Staff Comment)

The first of the “Actions” section of the Bases under the heading “B.1” is revised to provide improved clarity, consistency, and operator usability. (APOG Comment and NRC Staff Edit)

The first paragraph of the “SRs” section of the Bases under the heading “SR 3.7.2.1” is revised. (DOC D09, APOG Comment, and NRC Staff Edit)

The acronym “FSAR” is added to modify “Section” and “Chapter” in references to the FSAR throughout the Bases. (DOC A003) (APOG Comment)

VI. Traveler Information

Description of TSTF changes:

The proposed change removes the specific isolation time for the isolation valves from the associated AP1000 GTS Surveillance Requirements (SRs). The isolation times in the AP1000 GTS SRs are replaced with the requirement to verify the valve isolation time is within limits. The specific valve isolation time required to meet the AP1000 STS surveillances would be located outside of the technical specifications in a document subject to control by the 10 CFR 50.59 process.

Rationale for TSTF changes:

In accordance with the Improved Standard Technical Specification (ISTS) definition of Engineered Safety Feature (ESF) Response Time, the affected valve isolation times are part of the ESF Response Time. The ISTS does not specify the specific ESF Response Time acceptance criteria in the technical specifications or Bases. The ISTS only requires the ESF response time to be verified within the limit. The proposed change would make the requirements pertaining to ESF Response Times consistent within the ISTS.

Similar to the ISTS allowance for the ESF and Reactor Trip System (RTS) Response Times to be located outside the technical specifications, the proposed change will allow the affected valve isolation times to be revised in accordance with 10 CFR 50.59 instead of a license amendment request. See references 4-9.

Description of changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:

DOC A096 revises the title of GTS 3.7.3, “Main Feedwater Isolation and Control Valves (MFIVs and MFCVs),” to STS 3.7.3, “Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Control Valves (MFCVs).”

DOC A097 revises the Actions Note. Condition A is revised. Required Action A.1 is revised. Required Action A.2 is revised. Action B is deleted. Action C is renumbered to Action B and Condition C is revised from “Two valves in the same flow path inoperable,” to “One or both feedwater flow paths with associated MFIV and MFCV inoperable.” Action D is renumbered to Action C and Required Action D.3.1 is deleted. In addition, Required Action D.3.2 is revised to be Required Action C.3 (no second level of numbering).

DOC M11 revises the Applicability from “MODES 1, 2, 3, and 4 except when the MFIVs or associated MFCV are closed and deactivated,” to “MODES 1, 2, 3, and 4.” GTS 3.7.3 Required Action D.3.1, which allows the affected flow path to be isolated in lieu of being in MODE 5, is deleted.

The GTS 3.7.3 Applicability is Modes 1, 2, 3, and 4 except when the MFIVs or associated MFCVs are closed and deactivated. DOC M15 changes the STS 3.7.3 Applicability to be MODES 1, 2, 3, and 4, with no exceptions.

DOC D09 provides the same change implemented by TSTF 491-A described above.

A more detailed description of each DOC can be found in Reference 2, VEGP TSU LAR Enclosure 1, and the NRC staff safety evaluation can be found in Reference 3, VEGP LAR SER. The VEGP TSU LAR was modified in response to NRC staff RAIs in Reference 11 and the Southern Nuclear Operating Company RAI Response in Reference 12.

Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:

DOC A096 provides clarity for the LCO requirements.

DOC A097 is consistent with other TS discussions of flow path.

DOC M11 provides closed system containment isolation valve requirements that are either consistent with or more restrictive than those in GTS 3.6.3.

DOC M15 removes the exception statement from the LCO Applicability. When the unit is in MODE 1, 2, 3, or 4, GTS 3.7.3 does not apply to the valves whose flow path is isolated by a closed and deactivated valve. Thus, when a MFCV is inoperable in Mode 1, 2, 3, or 4, once the affected flow path is isolated using a closed and deactivated MFCV, as required by Required Action A.1 or B.1, LCO 3.7.3 would not apply and the periodic verification of Required Actions A.2 and B.2 would not be required.

DOC D09 implements the same changes as TSTF-491-A.

Description of additional changes proposed by NRC staff/preparer of GTST:

The fourth paragraph with the bulleted list in the “Background” section of the Bases is revised to state (NRC Staff Comment):

> The MFIVs and MFCVs close on receipt of engineered safeguards feedwater isolation signal generated from any of the following conditions:
>
> - Automatic or manual safeguards actuation “S” signal
>
> — **Safeguards Actuation - Manual Initiation (Table 3.3.9-1 Function 1)**
> — **Containment Pressure - High 2 (Table 3.3.8-1 Function 2)**
> — **Pressurizer Pressure - Low (Table 3.3.8-1 Function 5)**
> — **RCS Cold Leg Temperature (T_{cold}) - Low (Table 3.3.8-1 Function 11)**
> — **Steam Line Pressure - Low (Table 3.3.8-1 Function 24)**
>
> - **Steam Generator Narrow Range Water Level - High 2 (Table 3.3.8-1 Function 23)** ~~High steam generator level~~
>
> - **Reactor Coolant Average Temperature (T_{avg}) - Low 2 (Table 3.3.8-1 Function 13)** ~~Low-2 T_{avg} signal~~ coincident with reactor trip (P-4) **(LCO 3.3.12) (MFIVs only)**
>
> - **Reactor Coolant Average Temperature (T_{avg}) - Low 1 (Table 3.3.8-1 Function 12) coincident with reactor trip (P-4) (LCO 3.3.12) (MFCVs only)**
>
> - **Feedwater Isolation - Manual Initiation** ~~Manual actuation~~ **(Table 3.3.9-1 Function 5)**

~~Additionally, the MFIVs close automatically on a Low-1 Tavg coincident with reactor trip (P-4).~~ Each valve may be actuated manually. In addition to the MFIVs and the MFCVs, a check valve is available outside containment to isolate the feedwater line penetrating containment. In the event of feedwater line depressurization due to pump trip on **a feedwater** line break, the check valve provides rapid backup isolation of the steam generators limiting the inventory loss. A description of the MFIVs and MFCVs is found in Reference 1.

The third sentence of the first paragraph in the “ASA” section of the Bases is revised to state (NRC Staff Comment):

. . . Closure of the MFIVs ~~(or~~**and** MFCVs~~)~~ may also be relied on to mitigate an SLB for core response analysis and excess feedwater event upon the receipt of a ~~steam generator water level - High 2~~ **Steam Generator Narrow Range Water Level - High 2 (Table 3.3.8-1 Function 23)** signal.

The first sentence of the “LCO” section of the Bases is revised to state (APOG Comment and NRC Staff Edit):

This LCO ensures that the MFIVs and the MFCVs will isolate the main feedwater system **from the secondary side of the steam generators**.

The third sentence of the first paragraph in the “Applicability” section of the Bases is revised to state (APOG Comment):

In MODE**S** 1, 2, 3, ~~or~~**and** 4, these valves are required to be OPERABLE to limit...

The first and third paragraphs of the “Actions” section of the Bases under the heading “A.1 and A.2” are revised to state (NRC Staff Comment):

~~With~~**The condition of** one or **both feedwater flow paths with an MFIV or MFCV inoperable corresponds to one of the following possible situations: ~~(~~one or** two MFIVs **inoperable**, ~~or~~ one or two MFCVs **inoperable, or the MFIV inoperable in one flow path and the MFCV inoperable in the other flow path.**~~inoperable),~~ **In this condition, each~~the~~** ~~close or isolate inoperable~~ affected flow path **must be isolated** in 72 hours. When ~~these~~**a feedwater** flow path~~s are~~ **is** isolated, ~~they are~~ **it is** performing the~~ir~~ required safety function.

. . .

For inoperable MFIVs and MFCVs ~~valves~~ that cannot be restored to OPERABLE status within the specified Completion Time ~~but **whose affected**~~**for which each associated flow path is** ~~are closed or~~ isolated, the **affected** flow paths must be **periodically** verified ~~on a periodic basis~~ to be ~~closed or~~ isolated. This is necessary to ensure that the assumptions in the safety analyses remain valid. The ~~7 day~~**periodic** Completion Time **of once per 7 days** is reasonable based on engineering judgment, in view of valve status indications available in the control room~~,~~ and other administrative controls~~, to~~**that** ensure ~~that these valves are closed or~~**each affected feedwater flow path remains** isolated.

The first paragraph of the “Actions” section of the Bases under the heading “B.1” is revised to state (APOG Comment and NRC Staff Edit):

With ~~**both feedwater flow paths with**~~**the** ~~**associated**~~ **MFIV and MFCV both inoperable** ~~(two inoperable valves in the same flow path)~~ **in one or both feedwater flow paths**, there may be no redundant system to ~~operate~~

automatically ~~to and~~ perform the required **isolation** safety function **in each affected feedwater flow path**. ~~Under these conditions,~~ **In this condition, within 8-hours, either** one valve in ~~the~~**each** affected flow path must be restored to OPERABLE status, or ~~the~~**each** affected flow path **must be** isolated ~~within 8-hours~~. This action returns the system to the situation in which at least one valve in ~~the~~**each** affected flow path is performing the required safety function. The 8 hour Completion Time is a reasonable amount of time to complete the actions required to **isolate the affected flow paths, which may include closing** ~~close~~ the MFIV~~,~~ or MFCV, ~~which includes~~ **and** performing a controlled plant shutdown. The Completion Time is reasonable based on operating experience to reach MODE 2 with the **feedwater flow paths isolated**~~MFIV or MFCV closed~~, from full-power conditions in an orderly manner and without challenging plant systems.

The first paragraph of the “SRs” section of the Bases under the heading “SR 3.7.2.2” is revised to state (APOG Comment and NRC Staff Edit):

This SR verifies that the closure time of each MFIV and MFCV is ≤ 5.0 seconds, on an actual or simulated actuation signal. The MFIV and MFCV isolation times are assumed in the accident and containment analyses. **The ACTUATION LOGIC TEST overlaps this Surveillance to provide complete testing of the safety function.** This Surveillance is normally performed upon returning the unit to operation following a refueling outage. These valves should not be tested at power, since even a part stroke exercise increases the risk of a valve closure when the unit is generating power. This is consistent with the ASME OM Code (Ref. 2) quarterly stroke requirements during operation in MODE**S** 1 ~~or~~**and** 2.

The acronym “FSAR” is added to modify “Section” and “Chapter” in references to the FSAR throughout the Bases. (DOC A003) (APOG Comment)

Rationale for additional changes proposed by NRC staff/preparer of GTST:

These changes are to correct grammatical errors in the bases.

The non-technical changes to the “Background” section of the Bases provide improved clarity, consistency, and operator usability.

The non-technical changes to the “ASA” section of the Bases provide improved clarity, consistency, and operator usability.

The non-technical changes to the “LCO” section of the Bases provide improved clarity, consistency, and operator usability.

The non-technical changes to the “Applicability” section of the Bases provide improved clarity, consistency, and operator usability.

The non-technical changes to the “Actions” section of the Bases provide improved clarity, consistency, and operator usability.

DOC D09 made the Regulatory commitment to relocate the closure time to the Bases. Similarly, V.C. Summer TSU LAR proposes the same commitment to the Bases. Since each represented AP1000 Utility is committed to maintaining standardization, there currently is no rationale for an AP1000 STS that differs from the TSU LAR commitments and plant- specific Bases for VEGP. Additionally, there is no COL Item, and no Reviewer’s Note defining the use of the optional

bracketed material. As such, this change to the “SRs” section of the Bases under the heading “SR 3.7.3.1” is inappropriate. The TSTF-491-A changes to the SR Bases (to only reference document containing the MSIV closure time) are not adopted, based on APOG presentation preference expressed in DOC D09. The remaining changes to this paragraph are non-technical and provide improved clarity, consistency, and operator usability.

Since Bases references to FSAR Sections and Chapters are to an external document, it is appropriate to include the “FSAR” modifier.

VII. GTST Safety Evaluation

Technical Analysis:

DOC A096 revises the title of GTS 3.7.3, “Main Feedwater Isolation and Control Valves (MFIVs and MFCVs),” to STS 3.7.3, “Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Control Valves (MFCVs).” This change is made to provide clarification.

The MFIVs and MFCVs isolate the nonsafety related portions from the safety related portions of the system. In the event of a secondary side pipe rupture inside containment, these valves limit the quantity of high energy fluid that enters the containment through a feedwater break.

By isolating the feedwater flow from the affected steam generator the MFIVs and MFCVs prevent overcooling the reactor core and over pressurizing of the containment from feedwater pump runout.

The GTS 3.7.3 Actions are written on an individual valve basis. Per DOC A097 and DOC M11, STS 3.7.3 Actions are written on a flow path basis. The revised Actions are generally consistent with the format for other TS for flow path isolation, e.g., GTS 3.6.3, GTS 3.7.7, and GTS 3.7.10. The changes do not result in any technical change to the GTS 3.7.3 requirements. When a flow path has an inoperable MFIV or MFCV, STS 3.7.3 Required Action A.1 provides 72 hours to isolate the affected flow path, consistent with the GTS 3.7.3 Required Action A.1 for an inoperable MFIV and GTS 3.7.3 Required Action B.1 for an inoperable MFCV. Each of these GTS 3.7.3 Required Actions is equivalent to the STS 3.7.3 Required Action A.1, in that each result in the isolation of the affected flow path. Therefore, STS 3.7.3 Required Action A.1 combines these two GTS 3.7.3 Actions into a single Action. If both valves (MFIV and MFCV) in a flow path are inoperable, STS 3.7.3 Required Action B.1 provides 8 hours to isolate the affected penetration, consistent with the GTS 3.7.3 Required Action C.1 requirements.

GTS 3.7.3 Required Action D.3.1 is redundant to GTS 3.7.3 Required Actions A.1 and B.1. When GTS 3.7.3 Condition D applies, Conditions A and B will also continue to apply, and their Required Actions continue to be required. GTS 3.7.3 Required Actions A.1 and B.1 require the affected flow path to be isolated, thus there is no need to repeat this Required Action as presented in GTS 3.7.3 Required Action D.3.1. STS 3.7.3 Required Action A.1 maintains this requirement to isolate the affected flow path. Once the flow path is isolated as required by GTS 3.7.3 Required Actions A.1 and B.1 and STS 3.7.3 Required Action A.1, GTS 3.7.3 Condition D would no longer apply and can be exited.

These DOC A097 changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to for clarity and consistency with other Specifications whose presentation approach is on a flow path basis. These changes do not result in technical changes to the TS.

DOC M11 revises the containment isolation function in GTS 3.7.3. GTS 3.6.3 provides the requirement for the containment isolation valve function. Some of the valves that are containment isolation valves are also required to be Operable to meet other safety related functions, and these requirements are provided in separate LCOs. Thus, for certain containment isolation valves on closed systems, the same valve has two separate TS that cover its requirements. GTS 3.7.1 provides requirements for MSSVs, GTS 3.7.2 provides requirements for the MSIVs, GTS 3.7.3 provides requirements for the MFIVs, GTS 3.7.7 provides requirements for the startup feedwater isolation valves, and GTS 3.7.10 provides requirements for the power operated relief valve (PORV) block valves and SG blowdown isolation valves.

In lieu of including these valves in both GTS 3.6.3 and their individual Specification, GTS 3.6.3 is revised to exclude all closed system containment isolation valves. All of the moved containment isolation valves are associated with a closed system and they are the only closed system containment isolation valves. The individual Specifications where these valves are moved to include the same or more restrictive requirements as currently in GTS 3.6.3, or have been revised to include the requirements from GTS 3.6.3.

The Applicability of GTS 3.7.3, which is Modes 1, 2, 3, and 4 except when the MFIVs or associated MFCV are closed and deactivated is revised to delete the exception of when the MFIVs are closed and deactivated to be consistent with the Applicability of GTS 3.6.3, which is Modes 1, 2, 3, and 4. Thus, the proposed Applicability is consistent with the GTS 3.6.3 Applicability for the MFIVs. The impact of this Applicability change to the MFCVs is discussed in DOC M15.

GTS 3.7.3, Required Action D.3.1, which allows the affected flow path to be isolated in lieu of being in MODE 5, is deleted. STS 3.7.3 will now ultimately require Mode 5 to be entered when the flow path is not isolated as required by Actions A and B. Under similar conditions (i.e., flow path not isolated as required by GTS 3.6.3 Action C), GTS 3.6.3 Condition D.2 requires Mode 5 to be entered. The impact of this change to the MFCVs is discussed in DOC A097.

The Actions of GTS 3.7.3 are consistent with or more restrictive than the requirements of GTS 3.6.3. GTS 3.7.3 Required Actions do not include the restrictions of GTS 3.6.3 Required Action C.1 that require deactivating the MFIV in the closed position if the MFIV were used to meet the action to isolate. Conversely, GTS 3.6.3 Required Action C.2 periodic verification of “Once per 31 days” is less restrictive than the periodic verification of GTS 3.7.3 Required Action A.2 of “Once per 7 days.” The GTS 3.7.3 more frequent verification adequately compensates for not imposing a requirement to deactivate the MFIV in the closed position. Additionally, GTS 3.7.3 Actions do not contain the flexibility found in GTS 3.6.3 Required Action C.2 Notes allowing administrative means to verify flow path isolation. The flexibility of GTS 3.6.3 Actions Note 1 (“Penetration flow path(s) may be unisolated intermittently under administrative controls”) is not applied for MFIVs in GTS 3.7.3 Actions and the flexibility of GTS 3.6.3 Actions Note 2 (“Separate Condition entry is allowed for each penetration flow path”) is not allowed in GTS 3.7.3; therefore GTS 3.7.3 imposes more restrictive Actions. GTS 3.6.3 Actions Notes 3 and 4 do not apply to MFIVs and are not included in STS 3.7.3.

The overall impact on safety from moving the Action requirement for MFIVs out of GTS 3.6.3 is minimal. The more restrictive Actions of GTS 3.7.3 to affect isolation result in achieving the appropriate compensatory measure and protection of public health and safety sooner and the more frequent verification adequately compensates for not requiring deenergization of the MFIVs. In the event that the flow path associated with MFIVs is not isolated, the default actions of GTS 3.6.3 Action D require being in Mode 3 within 6 hours and being in Mode 5 within 36 hours, which is consistent with GTS 3.7.3 Required Actions D.1 and D.3.2. GTS 3.7.3 Required Action D.2 imposes a more restrictive requirement to be in Mode 4 with the Reactor Coolant System (RCS) cooling provided by the Normal Residual Heat Removal System (RNS). These actions provide consistent or more restrictive actions for the MFIVs as moved from GTS 3.6.3 into STS 3.7.3.

GTS SR 3.7.3.1 reflects testing consistent with GTS SR 3.6.3.4 and SR 3.6.3.5 for verifying valve stroke times and actuation on an actual or simulated actuation signal. However, the Frequency of GTS SR 3.7.3.1 (“In accordance with the Inservice Testing Program”) is more restrictive than the “24 month” Frequency of GTS SRs 3.6.3.4 and 3.6.3.5. GTS 3.6.3 SRs 3.6.3.1, 3.6.3.2, and 3.6.3.3 are not applicable to MFIVs. Therefore, the STS 3.7.3

requirement, Actions, and SRs, as they relate to the MFIVs, are either consistent with or more restrictive than those in GTS 3.6.3.

TSTF-491-A and DOC D09 propose to relocate the required closure times for the MFIVs and MFCVs to the licensee controlled document (LCD) that is referenced in the Bases. Changes to the Bases or LCD are subject to the 10 CFR 50.59 process. The 10 CFR 50.59 (reference 5) criteria provide adequate assurance that prior staff review and approval will be requested by the licensee for changes to the Bases or Licensee Controlled Document requirements with the potential to affect the safe operation of the plant. Furthermore, the MFIVs and MFCVs are subject to periodic testing and acceptance criteria in accordance with the Inservice Testing (IST) Program. Compliance with the IST Program is required by Section 5.5.3 of the AP1000 GTS and 10 CFR 50.55. The IST Program includes specific reference value baseline operating times for valves that are not subject to arbitrary changes.

10 CFR 50.36 requires the inclusion of the periodic testing of the MFIVs and MFCVs in the Surveillance Requirements, not the actual closure time of the valves. TSTF-491-A maintains the periodic testing requirements for MFIVs and MFCVs in accordance with 10 CFR 50.36 (Reference 4).

Based on the requirements of 10 CFR 50.36, 10 CFR 50.59 and the IST Program, the staff concludes that relocating the MFIVs and MFCVs closure times to the LCD as referenced in the Bases is acceptable.

DOC M15 revises the Applicability to be MODES 1, 2, 3, and 4, with no exceptions. When the unit is in Mode 1, 2, 3, or 4, GTS 3.7.3 does not apply to the valves whose flow path is isolated by a closed and deactivated valve. Thus, when a MFCV is inoperable in Mode 1, 2, 3, or 4, once the affected flow path is isolated using a closed and deactivated MFCV, as required by GTS 3.7.3 Required Action A.1 or B.1, LCO 3.7.3 would not apply and the periodic verification of GTS 3.7.3 Required Actions A.2 and B.2 would not be required.

Similar to the Applicability of GTS 3.6.3, the GTS 3.7.3 Applicability is changed to eliminate this exception once the affected flow path is isolated. The MFCVs will still be required to be Operable in Modes 1, 2, 3, and 4, even when the affected flow path is isolated. This change will ensure that the periodic verification of GTS 3.7.3 Required Actions A.2 and B.2 is performed as long as a valve in the affected flow path remains inoperable. This change is acceptable since it ensures the flow path is periodically verified to be in the post accident state (i.e., isolated) anytime when in Modes 1, 2, 3, and 4 with an associated isolation valve inoperable.

The remaining changes are editorial, clarifying, grammatical, or otherwise considered administrative. These changes do not affect the technical content, but improve the readability, implementation, and understanding of the requirements, and are therefore acceptable.

Having found that this GTST’s proposed changes to the GTS and Bases are acceptable, the NRC staff concludes that AP1000 STS Subsection 3.7.3 is an acceptable model Specification for the AP1000 standard reactor design.

References to Previous NRC Safety Evaluation Reports (SERs):

TSTF-491-A: Federal Register, Volume 71, No. 193, Thursday, October 5, 2006, Notices

VIII. Review Information

Evaluator Comments:

None

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Review Information:

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on 5/19/2014.

APOG Comments (Ref. 13) and Resolutions:

1. (Internal # 3) Throughout the Bases, references to Sections and Chapters of the FSAR do not include the “FSAR” clarifier. Since these Section and Chapter references are to an external document, it is appropriate (DOC A003) to include the “FSAR” modifier. This is resolved by adding the FSAR modifier as appropriate.

2. (Internal # 6) The GTST sections often repeat VEGP LAR DOCs, which reference “existing” and “current” requirements. The inclusion in the GTST of references to “existing” and “current,” are not always valid in the context of the GTS. Each occurrence of “existing” and “current” should be revised to be clear and specific to GTS, MTS, or VEGP COL TS (or other), as appropriate. Noted ambiguities are corrected in the GTST body.

3. (Internal # 7) Section VII, GTST Safety Evaluation, inconsistently completes the subsection “References to Previous NRC Safety Evaluation Reports (SERs)” by citing the associated SE for VEGP 3&4 COL Amendment 13. It is not clear whether there is a substantive intended difference when omitting the SE citation. This is resolved by removing the SE citation in Section VII of the GTST and ensuring that appropriate references to the consistent citation of this reference in Section X of the GTST are made.

4. (Internal #13) Many GTSTs evaluated TSTF-425 with the following note: Risk-informed TS changes will be considered at a later time for application to the AP1000 STS.

   The NRC approval of TSTF-425, and model safety evaluation provided in the CLIIP for TSTF-425, are generically applicable to any design’s Technical Specifications. As such, the replacement of certain Frequencies with a Surveillance Frequency Control Program should be included in the GTST for AP1000 STS NUREG.

   However, implementation in the AP1000 STS should not reflect optional (i.e., bracketed) material showing retention of fixed Surveillance Frequencies where relocation to a Surveillance Frequency Control Program is acceptable. Since each represented AP1000 Utility is committed to maintaining standardization, there is no rationale for an AP1000 STS that includes bracketed options.

Consistent with TSTF-425 criteria, replace applicable Surveillance Frequencies with "In accordance with the Surveillance Frequency control Program" and add that Program as new AP1000 STS Specification 5.5.15.

NRC Staff disagreed with implementing TSTF-425 in the initial version of the STS. Although the APOG thinks the analysis supporting this traveler is general enough to be applicable to AP1000, staff thinks an AP1000-specific proposal from APOG is needed to identify any GTS SRs that should be excluded. Also, with the adoption of a Surveillance Frequency Control Program (SFCP) in the AP1000 STS, bracketed Frequencies, which provide a choice between the GTS Frequency and the SFCP Frequency, are needed because the NRC will use the AP1000 STS as a reference, and to be consistent with NUREG-1431, Rev. 4. APOG was requested to consider proposing an AP1000 version of TSTF-425 for a subsequent revision of the STS.

5. (Internal # 403) Section V, Changes to the GTST Generic Technical Specifications and Bases discussion for GTS 3.7.3 incorrectly references DOC L09 (instead of "D09") in the description of changes for SR 3.7.3.1. Revise the references to "DOC L09" to "DOC D09" in the last two paragraphs of the GTS 3.7.3 description of changes to the Generic Technical Specifications. This is resolved by making the recommended change.

6. (Internal # 404) The second sentence of the first paragraph in Section VII that discusses DOC M15 says "STS 3.7.3 Required Action F.3 is added to be in MODE 5 in 36 hours." This Required Action was not added by DOC M15. The Required Action was already in the GTS. Delete this sentence. This is resolved by making the recommended change.

7. (Internal # 405) In the "LCO" section of the Bases, revise the first sentence as follows:

   This LCO ensures that the MFIVs and the MFCVs will isolate the main feedwater system **to the secondary side of the steam generators**.

   This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change with additional edits. The NRC staff recommends editing the first sentence as follows:

   This LCO ensures that the MFIVs and the MFCVs will isolate the main feedwater system **from the secondary side of the steam generators**.

   In addition, the NRC staff recommends revising the fourth paragraph with the bulleted list in the "Background" section of the Bases as follows:

   The MFIVs and MFCVs close on receipt of engineered safeguards feedwater isolation signal generated from any of the following conditions:

   - Automatic or manual safeguards actuation "S" signal
     - **Safeguards Actuation - Manual Initiation (Table 3.3.9-1 Function 1)**
     - **Containment Pressure - High 2 (Table 3.3.8-1 Function 2)**
     - **Pressurizer Pressure - Low (Table 3.3.8-1 Function 5)**
     - **RCS Cold Leg Temperature (T_{cold}) - Low (Table 3.3.8-1 Function 11)**
     - **Steam Line Pressure - Low (Table 3.3.8-1 Function 24)**

- **Steam Generator Narrow Range Water Level - High 2 (Table 3.3.8-1 Function 23)** ~~High steam generator level~~

- **Reactor Coolant Average Temperature (T_{avg}) - Low 2 (Table 3.3.8-1 Function 13)** ~~Low-2 T_{avg} signal~~ coincident with reactor trip (P-4) **(LCO 3.3.12) (MFIVs only)**

- **Reactor Coolant Average Temperature (T_{avg}) - Low 1 (Table 3.3.8-1 Function 12) coincident with reactor trip (P-4) (LCO 3.3.12) (MFCVs only)**

- **Feedwater Isolation - Manual Initiation** ~~Manual actuation~~ **(Table 3.3.9-1 Function 5)**

~~Additionally, the MFIVs close automatically on a Low-1 Tavg coincident with reactor trip (P-4).~~ Each valve may be actuated manually. In addition to the MFIVs and the MFCVs, a check valve is available outside containment to isolate the feedwater line penetrating containment. In the event of feedwater line depressurization due to pump trip on **a feedwater** line break, the check valve provides rapid backup isolation of the steam generators limiting the inventory loss. A description of the MFIVs and MFCVs is found in Reference 1.

Revise the third sentence of the first paragraph in the “ASA” section of the Bases as follows:

. . . Closure of the MFIVs ~~(or~~**and** MFCVs~~)~~ may also be relied on to mitigate an SLB for core response analysis and excess feedwater event upon the receipt of a ~~steam generator water level - High 2~~ **Steam Generator Narrow Range Water Level - High 2 (Table 3.3.8-1 Function 23)** signal.

8. (Internal # 406) In the “Applicability” section of the Bases, revise the third sentence of the first paragraph as follows:

In MODE**S** 1, 2, 3, ~~or~~**and** 4, these valves are required to be OPERABLE to limit . . .

This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change.

9. (Internal # 407) In the “Actions” section of the Bases under the heading “B.1” revise the first paragraph as follows:

With **one or** both feedwater flow paths with associated MFIV and MFCV inoperable . . .

This non-technical change provides improved clarity, consistency, and operator usability. This is resolved by making the recommended change with additional edits. The NRC staff recommends editing the first and third paragraphs of the “Actions” section of the Bases under the heading “A.1 and A.2” as follows:

~~With~~**The condition of** one or **both feedwater flow paths with an MFIV or MFCV inoperable corresponds to one of the following possible situations: (one or** two MFIVs **inoperable**, ~~or~~ one or two MFCVs

inoperable, or the MFIV inoperable in one flow path and the MFCV inoperable in the other flow path.~~inoperable),~~ **In this condition, each**~~the close or isolate inoperable~~ affected flow path **must be isolated** in 72 hours. When ~~these~~**a feedwater** flow path~~s are~~ **is** isolated, ~~they are~~ **it is** performing the~~ir~~ required safety function.

. . .

For inoperable MFIVs and MFCVs ~~valves~~ that cannot be restored to OPERABLE status within the specified Completion Time ~~but~~ ~~**whose affected**~~**for which each associated flow path is** ~~are closed or~~ isolated, the **affected** flow paths must be **periodically** verified ~~on a periodic basis~~ to be ~~closed or~~ isolated. This is necessary to ensure that the assumptions in the safety analyses remain valid. The ~~7 day~~**periodic** Completion Time **of once per 7 days** is reasonable based on engineering judgment, in view of valve status indications available in the control room~~,~~ and other administrative controls~~, to~~**that** ensure ~~that these valves are closed or~~**each affected feedwater flow path remains** isolated.

The NRC staff recommends editing the first paragraph of the "Actions" section of the Bases under the heading "B.1" as follows:

With ~~**both feedwater flow paths with**~~**the** ~~**associated**~~ **MFIV and MFCV both inoperable** ~~(two inoperable valves in the same flow path)~~ **in one or both feedwater flow paths**, there may be no redundant system to ~~operate~~ automatically ~~**to**~~ ~~and~~ perform the required **isolation** safety function **in each affected feedwater flow path**. ~~Under these conditions,~~ **In this condition, within 8-hours, either** one valve in ~~the~~**each** affected flow path must be restored to OPERABLE status, or ~~the~~**each** affected flow path **must be** isolated ~~within 8-hours~~. This action returns the system to the situation in which at least one valve in ~~the~~**each** affected flow path is performing the required safety function. The 8 hour Completion Time is a reasonable amount of time to complete the actions required to **isolate the affected flow paths, which may include closing** ~~close~~ the MFIV~~,~~ or MFCV, ~~which includes~~ **and** performing a controlled plant shutdown. The Completion Time is reasonable based on operating experience to reach MODE 2 with the **feedwater flow paths isolated**~~MFIV or MFCV closed~~, from full-power conditions in an orderly manner and without challenging plant systems.

10. (Internal # 408 and 409) In the "SRs" section of the Bases, under the heading "SR 3.7.3.1," revise the first paragraph as follows:

This SR verifies that the closure time of each MFIV and MFCV is **≤ 5.0 seconds,** ~~within the limit given in Reference 2~~ on an actual or simulated actuation signal**. The MFIV and MFCV isolation times are** ~~and is within that~~ assumed in the accident and containment analyses. . . . ~~This SR also verifies the valve closure time is in accordance with the Inservice Testing Program.~~ This **Surveillance** ~~SR~~ is normally performed upon returning the unit to operation following a refueling outage. . . . This is consistent with the ASME OM Code (Ref. **2**~~3~~) quarterly stroke requirements during operation in MODE 1 or 2.

DOC D09 made the Regulatory commitment to relocate the closure time to the Bases. Similarly, V.C. Summer TSU LAR proposes the same commitment to the Bases. Since each represented AP1000 Utility is committed to maintaining standardization, there currently is no rationale for an AP1000 STS that differs from the TSU LAR commitments

and plant- specific Bases for VEGP. Additionally, there is no COL Item, and no Reviewer's Note defining the use of the optional bracketed material. As such, this change is inappropriate. The TSTF-491-A changes to the SR Bases (to only reference document containing the MSIV closure time) are not adopted, based on APOG presentation preference expressed in DOC D09. Reference 2 inserted by TSTF-491 should be removed. The remaining portions of this change are non-technical and provide improved clarity, consistency, and operator usability. This is resolved by making the recommended change with additional edits:

> . . . This is consistent with the ASME OM Code (Ref. **2**~~3~~) quarterly stroke requirements during operation in MODE**S** 1 **and**~~or~~ 2.

NRC Final Approval Date: 12/8/2015

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IX. Evaluator Comments for Consideration in Finalizing Technical Specifications and Bases

The GTS 3.7.3 mark-up Surveillance Table was split over two pages by the database report generator for the single SR. For Rev. 0 of this GTST, it was necessary to manually remove the split to keep the entire contents of the Surveillance Table on a a single page.

X. References Used in GTST

1. AP1000 DCD, Revision 19, Section 16, “Technical Specifications,” June 2011 (ML11171A500).

2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Technical Specifications Upgrade License Amendment Request, February 24, 2011 (ML12065A057).

3. NRC Safety Evaluation (SE) for Amendment No. 13 to Combined License (COL) No. NPF-91 for Vogtle Electric Generating Plant (VEGP) Unit 3, and Amendment No. 13 to COL No. NPF-92 for VEGP Unit 4, September 9, 2013, ADAMS Package Accession No. ML13238A337, which contains:

ML13238A355	Cover Letter - Issuance of License Amendment No. 13 for Vogtle Units 3 and 4 (LAR 12-002).
ML13238A359	Enclosure 1 - Amendment No. 13 to COL No. NPF-91
ML13239A256	Enclosure 2 - Amendment No. 13 to COL No. NPF-92
ML13239A284	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13)
ML13239A287	Enclosure 4 - Safety Evaluation (SE), and Attachment 1 - Acronyms
ML13239A288	SE Attachment 2 - Table A - Administrative Changes
ML13239A319	SE Attachment 3 - Table M - More Restrictive Changes
ML13239A333	SE Attachment 4 - Table R - Relocated Specifications
ML13239A331	SE Attachment 5 - Table D - Detail Removed Changes
ML13239A316	SE Attachment 6 - Table L - Less Restrictive Changes

   The following documents were subsequently issued to correct an administrative error in Enclosure 3:

ML13277A616	Letter - Correction To The Attachment (Replacement Pages) - Vogtle Electric Generating Plant Units 3 and 4-Issuance of Amendment Re: Technical Specifications Upgrade (LAR 12-002) (TAC No. RP9402)
ML13277A637	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13) (corrected)

4. 10 CFR 50.36, “Technical Specifications.”

5. 10 CFR 50.59, “Changes , Tests, and Experiments.”

6. NRC SER for Beaver Valley Power Station (BVPS) Unit 2 Amendment # 137 issued 6/25/03 (TAC NO. MB5686).

7. NRC SER for BVPS License Amendment numbers 210 (Unit 1) and 88 (Unit 2) issued 1/20/98 (TAC NOS. M99671 and M99672).

8. Generic Letter 93-08, “Relocation of Technical Specification Tables of Instrument Response Time Limits,” dated 12/29/93.

9. Generic Letter 91-08, “Removal of Component Lists From Technical Specifications,” dated 5/6/91.

10. TSTF-GG-05-01, “Writer's Guide for Plant-Specific Improved Technical Specifications,” June 2005.

11. RAI Letter No. 01 Related to License Amendment Request (LAR) 12-002 for the Vogtle Electric Generating Plant Units 3 and 4 Combined Licenses, September 7, 2012 (ML12251A355).

12. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Response to Request for Additional Information Letter No. 01 Related to License Amendment Request LAR-12-002, ND-12-2015, October 04, 2012 (ML12286A363 and ML12286A360)

13. APOG-2014-008, APOG (AP1000 Utilities) Comments on AP1000 Standardized Technical Specifications (STS) Generic Technical Specification Travelers (GTSTs), Docket ID NRC-2014-0147, September 22, 2014 (ML14265A493).

XI. MARKUP of the Applicable GTS Subsection for Preparation of the STS NUREG

The entire section of the Specifications and the Bases associated with this GTST is presented next.

Changes to the Specifications and Bases are denoted as follows: Deleted portions are marked in strikethrough red font, and inserted portions in bold blue font.

3.7 PLANT SYSTEMS

3.7.3 Main Feedwater Isolation **Valves (MFIVs)** and **Main Feedwater** Control Valves (~~MFIVs and~~ MFCVs)

LCO 3.7.3 The MFIV and the MFCV for each Steam Generator shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4 ~~except when the MFIVs or associated MFCV are closed and deactivated~~.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each **feedwater flow path** ~~valve~~.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or **both feedwater flow paths with MFIV or MFCV** ~~two MFIVs~~ inoperable.	A.1 ~~Close or isolate~~ **Isolate** ~~the~~ **affected** ~~MFIV~~ flow path. AND A.2 Verify **affected flow path** ~~MFIV~~ is ~~closed or~~ isolated.	72 hours Once per 7 days
~~B. One or two MFCVs inoperable.~~	~~B.1 Close or isolate the MFCV the flow path.~~ ~~AND~~ ~~B.2 Verify MFCV is closed or isolated.~~	~~72 hours~~ ~~Once per 7 days~~

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B~~C~~. One or both feedwater flow paths with associated MFIV and MFCV ~~Two valves in the same flow path~~ inoperable.	**B~~C~~**.1 Isolate affected flow path.	8 hours
C~~D~~. Required Action and associated Completion Time not met.	**C~~D~~**.1 Be in MODE 3. AND	6 hours
	C~~D~~.2 Be in MODE 4 with the Reactor Coolant System (RCS) cooling provided by the Normal Residual Heat Removal System (RNS). AND	24 hours
	~~D.3.1 Isolate the affected flow path(s).~~ ~~OR~~	~~36 hours~~
	C~~D~~.3~~.2~~ Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	----------NOTE---------- Only required to be performed prior to entry into MODE 2. ---------- Verify the closure time of each MFIV and MFCV is ~~≤ 5 seconds~~ **within limits** on an actual or simulated actuation signal.	In accordance with the Inservice Testing Program

B 3.7 PLANT SYSTEMS

B 3.7.3 Main Feedwater Isolation **Valves (MFIVs)** and **Main Feedwater** Control Valves (~~MFIVs and~~ MFCVs)

BASES

BACKGROUND

The MFIVs isolate main feedwater (MFW) flow to the secondary side of the steam generators following a high energy line break. The safety related function of the MFCVs is to provide the second isolation of MFW flow to the secondary side of the steam generators following a high energy line break. Closure of the MFIVs or MFCVs terminates flow to the steam generators, terminating the event for feedwater line breaks occurring upstream of the MFIVs or MFCVs. The consequences of events occurring in the main steam lines or in the MFW lines downstream from the MFIVs will be mitigated by their closure. Closure of the MFIVs or MFCVs, effectively terminates the addition of main feedwater to an affected steam generator, limiting the mass and energy release for steam or feedwater line breaks inside containment, and reducing the cooldown effects for steam line breaks (SLBs).

The MFIVs or MFCVs isolate the nonsafety related portions from the safety related portions of the system. In the event of a secondary side pipe rupture inside containment, the valves limit the quantity of high energy fluid that enters containment through the break, and provide a pressure boundary for the controlled addition of startup feedwater (SFW) to the intact loops of the steam generator.

One MFIV and one MFCV are located on each MFW line, outside but close to containment. The MFIVs and MFCVs are located in the MFW line and are independent of the delivery of the MFW or SFW via the SFW line which is separately connected and isolated from the steam generator. This configuration permits MFW or SFW to be supplied to the steam generators following MFIV or MFCV closure. The piping volume from these valves to the steam generators must be accounted for in calculating mass and energy releases following either an SLB or FWLB.

The MFIVs and MFCVs close on receipt of engineered safeguards feedwater isolation signal generated from any of the following conditions:

- Automatic or manual safeguards actuation “S” signal
  - **Safeguards Actuation – Manual Initiation (Table 3.3.9-1 Function 1)**

BASES

BACKGROUND (continued)

- **Containment Pressure – High 2 (Table 3.3.8-1 Function 2)**
- **Pressurizer Pressure – Low (Table 3.3.8-1 Function 5)**
- **RCS Cold Leg Temperature (T_{cold}) – Low (Table 3.3.8-1 Function 11)**
- **Steam Line Pressure – Low (Table 3.3.8-1 Function 24)**

- **Steam Generator Narrow Range Water Level – High 2 (Table 3.3.8-1 Function 23)** ~~High steam generator level~~

- **Reactor Coolant Average Temperature (T_{avg}) – Low 2 (Table 3.3.8-1 Function 13)** ~~Low-2 Tavg signal~~ coincident with reactor trip (P-4) **(LCO 3.3.12) (MFIVs only)**

- **Reactor Coolant Average Temperature (T_{avg}) – Low 1 (Table 3.3.8-1 Function 12) coincident with reactor trip (P-4) (LCO 3.3.12) (MFCVs only)**

- **Feedwater Isolation – Manual Initiation (Table 3.3.9-1 Function 5)** ~~Manual actuation~~

~~Additionally, the MFIVs close automatically on a Low-1 Tavg coincident with reactor trip (P-4).~~ Each valve may be actuated manually. In addition to the MFIVs and the MFCVs, a check valve is available outside containment to isolate the feedwater line penetrating containment. In the event of feedwater line depressurization due to pump trip on **a feedwater** line break, the check valve provides rapid backup isolation of the steam generators limiting the inventory loss. A description of the MFIVs and MFCVs is found in Reference 1.

APPLICABLE SAFETY ANALYSES

The design basis of the MFIVs and MFCVs is established by the analyses for the large SLB. It is also influenced by the accident analysis for the large Feedwater Line Break (FWLB). Closure of the MFIVs **and** ~~(or~~ MFCVs~~)~~ may also be relied on to mitigate an SLB for core response analysis and excess feedwater event upon the receipt of a **Steam Generator Narrow Range Water Level – High 2 (Table 3.3.8-1 Function 23)** ~~steam generator water level - High 2~~ signal.

Failure of an MFIV (or MFCV), to close following an SLB or FWLB, can result in additional mass and energy being delivered to the steam generators, contributing to cooldown. This failure also results in additional mass and energy releases following an SLB or FWLB event.

BASES

APPLICABLE SAFETY ANALYSES (continued)

In addition, the MFIVs are containment isolation valves and support the assumptions related to minimizing the loss of inventory and establishing the containment boundary during major accidents. Therefore, the safety analysis of any event requiring isolation of containment is applicable to the MFIVs.

The MFIVs and MFCVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO ensures that the MFIVs and the MFCVs will isolate the main feedwater system **from the secondary side of the steam generators**.

This LCO requires that the one isolation valve and one control valve on each feedwater line be OPERABLE. These valves are considered OPERABLE when their isolation times are within limits and they close on an isolation actuation signal.

Failure to meet the LCO requirements can result in additional mass and energy being released to containment following an SLB or FWLB inside containment. A main feedwater isolation signal on high steam generator level is relied on to terminate an excess feedwater flow event, and therefore failure to meet the LCO may result in the introduction of water into the main steam lines.

APPLICABILITY

The MFIVs and MFCVs must be OPERABLE whenever there is significant mass and energy in the Reactor Coolant System and the steam generators. This ensures that, in the event of a high energy line break, a single failure cannot result in the blowdown of more than one steam generator. In MODE**S** 1, 2, 3, **and** ~~or~~ 4, these valves are required to be OPERABLE to limit the amount of available fluid that could be added to the containment in the case of a secondary system pipe break inside containment **and where a DBA could cause a release of radioactive material to containment**. ~~When the valves are closed and deactivated or isolated by a closed manual valve, they are already performing their safety function.~~

In MODES 5 and 6 steam generator energy is low. Therefore, the MFIVs and the MFCVs are normally closed since MFW is not required.

BASES

ACTIONS

The ACTIONS table is modified by a Note indicating that separate condition entry is allowed for each **feedwater flow path** ~~valve~~.

A.1 **and A.2**~~, A.2, B.1, and B.2~~

The condition of ~~With~~ one or **both feedwater flow paths with an MFIV or MFCV inoperable corresponds to one of the following possible situations: one or** two MFIVs **inoperable**, ~~or~~ one or two MFCVs inoperable, **or the MFIV inoperable in one flow path and the MFCV inoperable in the other flow path. In this condition, each** ~~close or isolate inoperable~~ affected flow path **must be isolated** in 72 hours. When **a feedwater** ~~these~~ flow path**s is** ~~are~~ isolated, **it is** ~~they are~~ performing the**ir** required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves, and the low probability of an event that would require isolation of the main feedwater flow paths occurring during this period.

For inoperable MFIVs and MFCVs ~~valves~~ that cannot be restored to OPERABLE status within the specified Completion Time ~~but~~ **for which each associated flow path is** ~~are closed or~~ isolated, the **affected** flow paths must be **periodically** verified ~~on a periodic basis~~ to be ~~closed or~~ isolated. This is necessary to ensure that the assumptions in the safety analyses remain valid. The **periodic** ~~7 day~~ Completion Time **of once per 7 days** is reasonable based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls~~,~~ **that** ~~to~~ ensure **each affected feedwater flow path remains** ~~that these valves are closed or~~ isolated.

B~~C~~.1

With **the MFIV and MFCV both inoperable in one or both feedwater** ~~two inoperable valves in the same~~ flow path**s,** there may be no redundant system to ~~operate~~ automatically ~~and~~ perform the required **isolation** safety function **in each affected feedwater flow path**. **In this condition, within 8 hours, either** ~~Under these conditions,~~ one valve in **each** ~~the~~ affected flow path must be restored to OPERABLE status, or **each** ~~the~~ affected flow path **must be** isolated ~~within 8 hours~~. This action returns the system to the situation in which at least one valve in **each** ~~the~~ affected flow path is performing the required safety function. The 8 hour Completion Time is a reasonable amount of time to complete the actions required to **isolate the affected flow paths, which may include closing** ~~close~~ the MFIV~~,~~ or MFCV, **and** ~~which includes~~ performing a

BASES

ACTIONS (continued)

controlled plant shutdown. The Completion Time is reasonable based on operating experience to reach MODE 2 with the **feedwater flow paths isolated** ~~MFIV or MFCV closed~~, from full-power conditions in an orderly manner and without challenging plant systems.

C~~D~~.1, **C**~~D~~.2, and **C**~~D~~.3

If the MFIVs and MFCVs cannot be restored to OPERABLE status, or **the affected flow paths cannot be** ~~closed, or~~ isolated within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours, in MODE 4 with the normal residual heat removal system in service within 24 hours, and ~~the affected flow path isolated within 36 hours or~~ in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1

This SR verifies that the closure time of each MFIV and MFCV is ≤ 5.0 seconds, on an actual or simulated actuation signal. The MFIV and MFCV isolation times are assumed in the accident and containment analyses. **The ACTUATION LOGIC TEST overlaps this Surveillance to provide complete testing of the safety function.** This Surveillance is normally performed upon returning the unit to operation following a refueling outage. These valves should not be tested at power, since even a part stroke exercise increases the risk of a valve closure when the unit is generating power. This is consistent with the ASME OM Code (Ref. 2) quarterly stroke requirements during operation in MODE**S** 1 **and** ~~or~~ 2.

The Frequency is in accordance with the Inservice Testing Program.

The test is conducted in MODE 3 with the unit at operating temperature and pressure. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.

BASES

REFERENCES

1. **FSAR** Section 10.4.7, “Condensate and Feedwater System.”

2. ASME OM Code, “Code for Operation and Maintenance of Nuclear Power Plants.”

XII. Applicable STS Subsection After Incorporation of this GTST's Modifications

The entire subsection of the Specifications and the Bases associated with this GTST, following incorporation of the modifications, is presented next.

3.7 PLANT SYSTEMS

3.7.3 Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Control Valves (MFCVs)

LCO 3.7.3 The MFIV and the MFCV for each Steam Generator shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each feedwater flow path.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or both feedwater flow paths with MFIV or MFCV inoperable.	A.1 Isolate affected flow path. AND A.2 Verify affected flow path is isolated.	72 hours Once per 7 days
B. One or both feedwater flow paths with associated MFIV and MFCV inoperable.	B.1 Isolate affected flow path.	8 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2 Be in MODE 4 with the Reactor Coolant System (RCS) cooling provided by the Normal Residual Heat Removal System (RNS). AND	24 hours
	C.3 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	----------NOTE---------- Only required to be performed prior to entry into MODE 2. ---------- Verify the closure time of each MFIV and MFCV is within limits on an actual or simulated actuation signal.	In accordance with the Inservice Testing Program

B 3.7 PLANT SYSTEMS

B 3.7.3 Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Control Valves (MFCVs)

BASES

BACKGROUND

The MFIVs isolate main feedwater (MFW) flow to the secondary side of the steam generators following a high energy line break. The safety related function of the MFCVs is to provide the second isolation of MFW flow to the secondary side of the steam generators following a high energy line break. Closure of the MFIVs or MFCVs terminates flow to the steam generators, terminating the event for feedwater line breaks occurring upstream of the MFIVs or MFCVs. The consequences of events occurring in the main steam lines or in the MFW lines downstream from the MFIVs will be mitigated by their closure. Closure of the MFIVs or MFCVs, effectively terminates the addition of main feedwater to an affected steam generator, limiting the mass and energy release for steam or feedwater line breaks inside containment, and reducing the cooldown effects for steam line breaks (SLBs).

The MFIVs or MFCVs isolate the nonsafety related portions from the safety related portions of the system. In the event of a secondary side pipe rupture inside containment, the valves limit the quantity of high energy fluid that enters containment through the break, and provide a pressure boundary for the controlled addition of startup feedwater (SFW) to the intact loops of the steam generator.

One MFIV and one MFCV are located on each MFW line, outside but close to containment. The MFIVs and MFCVs are located in the MFW line and are independent of the delivery of the MFW or SFW via the SFW line which is separately connected and isolated from the steam generator. This configuration permits MFW or SFW to be supplied to the steam generators following MFIV or MFCV closure. The piping volume from these valves to the steam generators must be accounted for in calculating mass and energy releases following either an SLB or FWLB.

The MFIVs and MFCVs close on receipt of engineered safeguards feedwater isolation signal generated from any of the following conditions:

- Automatic or manual safeguards actuation “S” signal
  - Safeguards Actuation – Manual Initiation (Table 3.3.9-1 Function 1)

BASES

BACKGROUND (continued)

- Containment Pressure – High 2 (Table 3.3.8-1 Function 2)
- Pressurizer Pressure – Low (Table 3.3.8-1 Function 5)
- RCS Cold Leg Temperature (T_{cold}) – Low (Table 3.3.8-1 Function 11)
- Steam Line Pressure – Low (Table 3.3.8-1 Function 24)

- Steam Generator Narrow Range Water Level – High 2 (Table 3.3.8-1 Function 23)

- Reactor Coolant Average Temperature (T_{avg}) – Low 2 (Table 3.3.8-1 Function 13) coincident with reactor trip (P-4) (LCO 3.3.12) (MFIVs only)

- Reactor Coolant Average Temperature (T_{avg}) – Low 1 (Table 3.3.8-1 Function 12) coincident with reactor trip (P-4) (LCO 3.3.12) (MFCVs only)

- Feedwater Isolation – Manual Initiation (Table 3.3.9-1 Function 5)

Each valve may be actuated manually. In addition to the MFIVs and the MFCVs, a check valve is available outside containment to isolate the feedwater line penetrating containment. In the event of feedwater line depressurization due to pump trip on a feedwater line break, the check valve provides rapid backup isolation of the steam generators limiting the inventory loss. A description of the MFIVs and MFCVs is found in Reference 1.

APPLICABLE SAFETY ANALYSES

The design basis of the MFIVs and MFCVs is established by the analyses for the large SLB. It is also influenced by the accident analysis for the large Feedwater Line Break (FWLB). Closure of the MFIVs and MFCVs may also be relied on to mitigate an SLB for core response analysis and excess feedwater event upon the receipt of a Steam Generator Narrow Range Water Level – High 2 (Table 3.3.8-1 Function 23) signal.

Failure of an MFIV (or MFCV), to close following an SLB or FWLB, can result in additional mass and energy being delivered to the steam generators, contributing to cooldown. This failure also results in additional mass and energy releases following an SLB or FWLB event.

BASES

APPLICABLE SAFETY ANALYSES (continued)

In addition, the MFIVs are containment isolation valves and support the assumptions related to minimizing the loss of inventory and establishing the containment boundary during major accidents. Therefore, the safety analysis of any event requiring isolation of containment is applicable to the MFIVs.

The MFIVs and MFCVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO ensures that the MFIVs and the MFCVs will isolate the main feedwater system from the secondary side of the steam generators.

This LCO requires that the one isolation valve and one control valve on each feedwater line be OPERABLE. These valves are considered OPERABLE when their isolation times are within limits and they close on an isolation actuation signal.

Failure to meet the LCO requirements can result in additional mass and energy being released to containment following an SLB or FWLB inside containment. A main feedwater isolation signal on high steam generator level is relied on to terminate an excess feedwater flow event, and therefore failure to meet the LCO may result in the introduction of water into the main steam lines.

APPLICABILITY

The MFIVs and MFCVs must be OPERABLE whenever there is significant mass and energy in the Reactor Coolant System and the steam generators. This ensures that, in the event of a high energy line break, a single failure cannot result in the blowdown of more than one steam generator. In MODES 1, 2, 3, and 4, these valves are required to be OPERABLE to limit the amount of available fluid that could be added to the containment in the case of a secondary system pipe break inside containment and where a DBA could cause a release of radioactive material to containment.

In MODES 5 and 6 steam generator energy is low. Therefore, the MFIVs and the MFCVs are normally closed since MFW is not required.

BASES

ACTIONS

The ACTIONS table is modified by a Note indicating that separate condition entry is allowed for each feedwater flow path.

A.1 and A.2

The condition of one or both feedwater flow paths with an MFIV or MFCV inoperable corresponds to one of the following possible situations: one or two MFIVs inoperable, one or two MFCVs inoperable, or the MFIV inoperable in one flow path and the MFCV inoperable in the other flow path. In this condition, each affected flow path must be isolated in 72 hours. When a feedwater flow path is isolated, it is performing the required safety function.

The 72 hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves, and the low probability of an event that would require isolation of the main feedwater flow paths occurring during this period.

For inoperable MFIVs and MFCVs that cannot be restored to OPERABLE status within the specified Completion Time for which each associated flow path is isolated, the affected flow paths must be periodically verified to be isolated. This is necessary to ensure that the assumptions in the safety analyses remain valid. The periodic Completion Time of once per 7 days is reasonable based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls that ensure each affected feedwater flow path remains isolated.

B.1

With the MFIV and MFCV both inoperable in one or both feedwater flow paths, there may be no redundant system to automatically perform the required isolation safety function in each affected feedwater flow path. In this condition, within 8 hours, either one valve in each affected flow path must be restored to OPERABLE status, or each affected flow path must be isolated. This action returns the system to the situation in which at least one valve in each affected flow path is performing the required safety function. The 8 hour Completion Time is a reasonable amount of time to complete the actions required to isolate the affected flow paths, which may include closing the MFIV or MFCV, and performing a controlled plant shutdown. The Completion Time is reasonable based on operating experience to reach MODE 2 with the feedwater flow paths isolated, from full-power conditions in an orderly manner and without challenging plant systems.

BASES

ACTIONS (continued)

C.1, C.2, and C.3

If the MFIVs and MFCVs cannot be restored to OPERABLE status, or the affected flow paths cannot be isolated within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours, in MODE 4 with the normal residual heat removal system in service within 24 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1

This SR verifies that the closure time of each MFIV and MFCV is ≤ 5.0 seconds, on an actual or simulated actuation signal. The MFIV and MFCV isolation times are assumed in the accident and containment analyses. The ACTUATION LOGIC TEST overlaps this Surveillance to provide complete testing of the safety function. This Surveillance is normally performed upon returning the unit to operation following a refueling outage. These valves should not be tested at power, since even a part stroke exercise increases the risk of a valve closure when the unit is generating power. This is consistent with the ASME OM Code (Ref. 2) quarterly stroke requirements during operation in MODES 1 and 2.

The Frequency is in accordance with the Inservice Testing Program.

The test is conducted in MODE 3 with the unit at operating temperature and pressure. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.

REFERENCES

1. FSAR Section 10.4.7, “Condensate and Feedwater System.”

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